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**LYCOPENE**

A good reason to eat tomatoes

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Tomatoes are loved for their fresh taste and the versatile role they play in cooking. But research indicates there may be another reason to love them — they're loaded with lycopene (LY-ko-pene). Lycopene is a plant chemical (phytochemical) that gives tomatoes their red color. It also appears to offer potential health benefits.

**Inside your tomato**

Tomatoes contain a lot of nutrients, among them vitamins C and B-complex and the minerals iron and potassium. Also in the mix are carotenoids (kuh-ROT-uh-noids). These include lycopene and beta carotene, which is converted in the body into vitamin A.

Lycopene gets high marks from researchers for its apparently potent antioxidant properties. Antioxidants are thought to neutralize harmful substances in the body called "free radicals." These molecules, which result from normal cell metabolism as well as other causes, may contribute to cancer and cardiovascular disease.

**Possible health benefits**

Research into dietary lycopene suggests it may lower risk of:

- **Heart attack** — A study of more than 1,300

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European men suggested that those consuming the most lycopene from foods had about half the risk of heart attack as men who consumed less.

- **Prostate cancer** — A 5-year study of 48,000 men found that those eating 10 servings a week of cooked tomato products had the lowest risk of prostate cancer. Their risk was one-third that of men eating less than two servings a week.

Other studies suggest that lycopene may play a role in reducing the risk of other cancers, including colon, rectal and breast cancers.

## Add heat and eat

Fresh tomatoes are loaded with lycopene, but cooking tomatoes makes lycopene easier for your body to use. For instance, there's five times more available lycopene in tomato sauce than in an equivalent amount of fresh tomatoes. Apparently, heat breaks down tomato cell walls, freeing lycopene that would pass through your digestive system.

Including a little fat when you cook tomatoes can improve absorption of lycopene. Preferably, you should use a monounsaturated fat, such as olive oil.

## Getting your share

No one has determined how many servings of lycopene-rich foods to eat each week for health benefits. A serving is equivalent to a half cup of tomato or spaghetti sauce, a quarter cup of tomato paste, one medium tomato or one slice of pizza with tomato sauce. If you go by some studies, you might aim for seven to 10 servings a week.

You can get that in any number of ways, including tomato-based sauces (on pizza, pasta and other foods), canned tomatoes, soups, salsas, juice, ketchup and as a salad ingredient.

Other good food sources include watermelon and pink grapefruit, although the lycopene content is only about half to one-fifth that of canned tomatoes.

## A package deal

While researchers continue to study dietary lycopene, keep in mind that foods are complex nutrient packages. Researchers, therefore, are reluctant to label lycopene as the sole agent of "good" in tomatoes. It may simply point to or work with other protective substances in tomatoes that have yet to be identified or isolated.

As for lycopene supplements, any possible benefits or risks are unknown. For that reason, nutritionists generally recommend eating lycopene-rich foods instead of relying on a supplement.

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(October 97)

# Lycopene

**Antioxidant Decreases  
Prostate Cancer Risks 45%**

If you're a male, and if you live long enough, chances are that you'll get prostate cancer - autopsies reveal that by age 80 almost 100% of men suffer some degree of prostate cancer. Prostate cancer is a disease that threatens all men equally, with no regard for marital or socio-economic status. Standard

risk factors for predicting cancer (family history, obesity, smoking) are of no help in predicting chances of getting prostate cancer, with one important exception dietary habits.

Researchers have recently discovered that men who consume the highest amounts of cooked tomatoes have the lowest rates of prostate cancer, and, inversely, those who consume the lowest amounts have the highest rates. Although the protective effects of tomatoes have been suggested in earlier research, a recently published study in the Journal of the National Cancer Institute found that men who consumed cooked tomato products were less likely to develop prostate cancer. The study, titled "Intake of Carotenoids and Retinol in Relation to Risk of Prostate Cancer" found that men who consumed 10 or more servings a week of tomato-based foods were up to 45 percent less likely to develop prostate cancer. Those men who ate 4 to 7 portions per week reduced their chances for developing cancer by 20%.

The six-year study, led by Dr. Edward Giovannucci, concentrated on the dietary habits of 48,000 men, and found that tomato products accounted for almost 90 percent of the lycopene in the diet of the subjects. Surprisingly, while cooked tomato products, in the form of spaghetti or pizza sauce, offered protective benefits, raw tomatoes and tomato juice offered little if any protection. The reason for this difference is twofold. First, the cooking process breaks down the tomatoes' cell walls, releasing more lycopene. Second, the use of fats and oils in preparing tomato sauces enhances absorption of this fat-soluble carotenoid.

## Lycopene - A Prostate Friendly Carotenoid

Tomatoes, in addition to being a good source of a host of phytochemicals and antioxidant such as vitamins A and C, are also nature's richest source of lycopene, a red antioxidant carotenoid related to beta-carotene. Lycopene and beta-carotene are the predominant carotenoids in human tissues, and lycopene is the most abundant carotenoid found in the prostate gland tissues and serum. Lycopene is also found in watermelons, guavas and pink grapefruits, and is responsible for the characteristic red color associated with these fruits. The redder the color, the higher the lycopene content, explaining why tomatoes are the richest source of this unique compound (up to 10 mg. per tomato).

## How Lycopene Works

Lycopene is the most efficient scavenger of singlet oxygen of all of the common carotenoids and is able to quench free radicals twice as efficiently as beta-carotene. Current research suggest that lycopene's powerful antioxidant activity confers a high degree of protection against cholesterol oxidation, a process believed to influence prostate cancer. By-products of the oxidation of cholesterol (epoxides) measured in cancerous prostate tissue suggest that oxidized cholesterol is either a product of oxidative stress or that oxidized cholesterol has a direct carcinogenic effect. This antioxidant process may also confer heart disease benefits, for both men and women, as oxidation of LDL is one of the first steps in the formation of atherosclerosis.

Researchers have also discovered that lycopene increases gap-junctional communication between cells. This mechanism, which allows healthy cells to communicate with each other, is lost during malignant transformation of cells. It is theorized that by restoring this communication process lycopene may aid in reversing the malignant process.

## New Research

While additional research is being conducted to better understand the role of this strong antioxidant carotenoid in disease prevention, other studies are turning up other clues of Lycopenes' preventive effects:

- Research at the Dana Farber Cancer Center found that a reduction in prostate cancer risk may be linked to the ability of lycopene to inhibit proliferation of prostate tumor cells.

- A related study by Dr. Santos of Tufts University, Boston found that 50 mg of beta-carotene taken on alternate days increased the efficiency of natural killer (NK) cells, a vital component of the immune system believed to be especially critical in fighting tumor cells.

- A study from the University of Milan indicated that people who ate seven or more servings of tomato based products per week reduced their risk of mouth, stomach, colon and rectal cancer by up to 500%.
- A 1990 study by Dr. Vaneenwyk at the University of Illinois found that women with the highest levels of lycopene had a five times lower level of developing cervical cancer.
- Johns Hopkins University researchers reported in 1989 that people with the lowest levels of lycopene in their blood are five times more likely to develop pancreatic cancer.
- A clinical study published in 1990, the Skin Cancer Prevention Study Group, found that lycopene selectively reacts with UV light and may protect skin from photoaging and carcinogenesis
- Epidemiological reports also indicate a protective effect of lycopene on the incidence of cancer in patients with cervical intraepithelial neoplasia.
- Studies have revealed low serum levels of lycopene in patients who developed bladder and pancreatic cancers.
- Researchers have found lycopene to be more potent than alpha and beta-carotene in inhibiting human endometrial, mammary, and lung cancer cell growth.
- Lycopene at micromolar concentrations significantly inhibited the growth of human endometrial, mammary, and lung cancer cells in vitro.

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